



GeneratorJoe



**Power
Generation**

Spark-Ignited Generator Set Model GGLB 60 Hz

Natural Gas - 150 kW, 188 kVA Standby



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Description

The Cummins Power Generation GG-series commercial generator set is a fully integrated power generation system providing optimum performance, reliability, and versatility for stationary standby or prime power applications.

A primary feature of the GG GenSet is strong motor-starting capability and fast recovery from transient load changes. The torque-matched system includes a heavy-duty GM 4-cycle spark-ignited engine, an AC alternator with high motor-starting kVA capacity and an electronic voltage regulator for precise regulation under steady-state or transient loads. The GG GenSet accepts 100% of the nameplate standby rating in one step, in compliance with NFPA 110 requirements.

The GG GenSet offers both user- and environment-friendly operation. The optional PowerCommand® GenSet control is a microprocessor-based system with local or automatic remote starting/stopping, Smart Starting, integrated voltage regulation, alarm and status message display, AmpSentry protection, output metering, and auto-shutdown at fault detection, all to provide highly reliable GenSet performance.

A wide range of options, accessories, and services are available, allowing configuration to your specific power generation needs.

Every production unit is factory tested at rated load and power factor. This testing includes demonstration of rated power and single-step rated load pickup. Cummins Power Generation manufacturing facilities are registered to ISO9001 quality standards, emphasizing our commitment to high quality in the design, manufacture, and support of our products. The PowerCommand control is UL508 listed.

All Cummins Power Generation systems are backed by a comprehensive warranty program and supported by a worldwide network of 170 distributors and service branches to assist you with warranty, service, parts, and planned maintenance support.

Features

- **GM Heavy-Duty Gas Engine** - Rugged 4-cycle industrial spark-ignited engine delivers reliable power, low emissions, and fast response to load changes. The electronic governor provides fast response to load changes.
- **Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch winding, low waveform distortion with non-linear loads, fault clearing short-circuit capability, and class H insulation.
- **Permanent Magnet Generator (PMG)** - Optional PMG offers enhanced motor starting and fault-clearing short circuit capability.
- **Cooling Systems** - Standard cooling package provides reliable running at the standby and prime rating, at up to 50°C ambient temperature.
- **Integral Vibration Isolation** - Robust skid base supports the engine, alternator, and radiator on isolators, minimizing transmitted vibration.
- **E-Coat Finish** - Dual electro-deposition paint system provides high resistance to scratching, corrosion, and fading.
- **Enclosures** - Weather-protective and sound attenuated enclosures are available.
- **Optional PowerCommand Control** - provides full function microprocessor-based generator set control for compliance to NFPA110.
- **Warranty and Service** - Backed by a comprehensive warranty and worldwide distributor service network.

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Generator Set

The general specifications provide representative configuration details. Consult the outline drawing for installation design.

See outline drawing 0500-3866 for installation design specifications.

Unit Width, in (mm)	40.0 (1016)
Unit Height, in (mm)	56.0 (1422)
Unit Length, in (mm)	98.2 (2496)
Unit Dry Weight, lb (kg)	2550 (1157)
Unit Wet Weight, lb (kg)	2675 (1213)
Rated Speed, rpm	1800
Voltage Regulation, No Load to Full Load	±1.0%
Random Voltage Variation	±1.0%
Frequency Regulation	Isochronous
Random Frequency Variation	±0.5%
Radio Frequency Interference	IEC 801.2, Level 4 Electrostatic Discharge IEC 801.3, Level 3 Radiated Susceptibility IEC 801.4, Level 4 Electrical Fast Transients IEC 801.5, Level 5 Voltage Surge Immunity

	Natural Gas		
Cooling	Standby		
Fan Load, HP (kW)	8.5 (6.3)		
Coolant Capacity with radiator, US Gal (L)	5.9 (22.3)		
Coolant Flow Rate, Gal/min (L/min)	33.0 (124.9)		
Heat Rejection To Coolant, Btu/min (MJ/min)	6700.0 (7.1)		
Heat Radiated To Room, Btu/min (MJ/min)	4000.0 (4.2)		
Maximum Coolant Friction Head, psi (kPa)	2.0 (13.8)		
Maximum Coolant Static Head, ft (m)	10.0 (3.0)		
Air			
Combustion Air, scfm (m ³ /min)	335.0 (9.5)		
Alternator Cooling Air, scfm (m ³ /min)	1308.0 (37.0)		
Radiator Cooling Air, scfm (m ³ /min)	10000.0 (283.0)		
Max. Static Restriction, in H ₂ O (Pa)	0.50 (124.50)		

Rating Definitions

Standby Rating based on: Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. (Equivalent to Fuel Stop Power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated.

Prime (Unlimited Running Time) Rating based on: Applicable for supplying power in lieu of commercially purchased power. Prime power is the maximum power available at a variable load for an unlimited number of hours. A 10% overload capability is available for limited time. (Equivalent to Prime Power in accordance with ISO8528 and Overload Power in accordance with ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

Base Load (Continuous) Rating based on: Applicable for supplying power continuously to a constant load up to the full output rating for unlimited hours. No sustained overload capability is available for this rating. Consult authorized distributor for rating. (Equivalent to Continuous Power in accordance with ISO8528, ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

Site Derating Factors

Natural Gas

Engine power available up to 1950 ft (594 m) at ambient temperatures up to 104°F (40°C). Above 1950 ft (594 m) derate at 4% per 1000 ft (305 m), and 1% per 10°F (2% per 11°C) above 104°F (40°C).



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Engine

Rugged GM spark-ignited engines are designed to operate efficiently on gaseous fuels.

Electronic governing provides precise speed regulation when used with the optional PowerCommand control, especially useful for applications requiring constant (isochronous) frequency regulation such as Uninterruptible Power Supply (UPS) systems, non-linear loads, or sensitive electronic loads. Coolant heaters are required for all emergency standby installations or for any application requiring fast load acceptance after start-up.

Specifications – Engine

Base Engine	GM8.1L, Turbocharged and CAC
Displacement in³ (L)	496.0 (8.1)
Overspeed Limit, rpm	2400 ±50
Regenerative Power, kW	15.00
Cylinder Block Configuration	Cast iron, V 8 cylinder
Battery Capacity	300 amps minimum at ambient temperature of 32°F (0°C)
Battery Charging Alternator	70 amps
Starting Voltage	12-volt, negative ground
Lube Oil Filter Types	Single spin-on canister-combination full flow with bypass
Standard Cooling System	122°F (50°C) ambient radiator cooling system
Standard Fuel	Natural gas is standard.

Power Output	Natural Gas								
	Standby								
Gross Engine Power Output, bhp (kWm)	225.0 (167.8)								
BMEP at Rated Load, psi (kPa)	200.0 (1379.0)								
Bore, in. (mm)	4.25 (108.0)								
Stroke, in. (mm)	4.37 (111.0)								
Piston Speed, ft/min (m/s)	1310.0 (6.7)								
Compression Ratio	9.1:1								
Lube Oil Capacity, qt. (L)	8.0 (7.6)								
Fuel Flow									
Minimum Operating Pressure, in. H ₂ O (kPa)	7.0 (1.7)								
Maximum Operating Pressure, in. H ₂ O (kPa)	13.6 (3.4)								
Air Cleaner									
Maximum Air Cleaner Restriction, in. H ₂ O (kPa)	15.0 (3.7)								
Exhaust									
Exhaust Flow at Rated Load, cfm (m ³ /min)	1050.0 (29.7)								
Exhaust Temperature, °F (°C)	1215.0 (657.2)								
Max Back Pressure, in. H ₂ O (kPa)	20.0 (5.0)								
Fuel Consumption - Natural Gas	Standby								
60 Hz Ratings, kW (kVA)	150 (188)								
	Load	1/4	1/2	3/4	Full				
	cfh	730.0	1100.0	1540.0	1740.0				
	m ³ /hr	20.7	31.1	43.6	49.2				



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Alternator

Several alternators are available for application flexibility based on the required motor-starting kVA and other requirements. Larger alternator sizes have lower temperature rise for longer life of the alternator insulation system. In addition, larger alternator sizes can provide a cost-effective use of engine power in across-the-line motor-starting applications and can be used to minimize voltage waveform distortion caused by non-linear loads.

Single-bearing alternators couple directly to the engine flywheel with flexible discs for drivetrain reliability and durability. No gear reducers or speed changers are used. Two-thirds pitch windings eliminate third-order harmonic content of the AC voltage waveform. The standard excitation system is a PMG excited system.

Alternator Application Notes

Shunt or Separately Excited (PMG) System - Standard generator set utilizes a single phase sensing electronic voltage regulator to provide excitation control. Permanent Magnet Generator (PMG) units are provided with an integral PMG to supply power to the voltage regulator. PMG excitation control is via the PowerCommand Control, which provides a 3-phase sensing voltage regulation system. A PMG system generally has better motor-starting performance, lower voltage dip upon load application, and better immunity from problems with harmonics in the main alternator output induced by non-linear loads.

Alternator Sizes - On any given model, various alternator sizes are available to meet individual application needs. Alternator sizes are differentiated by maximum winding temperature rise, at the generator set standby or prime rating, when operated in a 40°C ambient environment. Available temperature rises range from 80°C to 150°C. Not all temperature rise selections are available on all models. Lower temperature rise is accomplished using larger alternators at lower current density. Lower temperature rise alternators have higher motor-starting kVA, lower voltage dip upon load application, and they are generally recommended to limit voltage distortion and heating due to harmonics induced by non-linear loads.

Alternator Space Heater - is recommended to inhibit condensation in outdoor environments.

Available Output Voltages

<u>Three Phase Reconnectable</u>	<u>Single Phase Non-Reconnectable</u>	<u>Three Phase Non-Reconnectable</u>
[] 120/208	[] 120/240	[] 347/600
[] 139/240		
[] 220/380		
[] 240/415		
[] 277/480		
[] 120/240 Delta		

Specifications – Alternator

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Direct coupled by flexible disc
Insulation System	Class H per NEMA MG1-1.65
Standard Temperature Rise	150°C Standby
Exciter Type	Permanent Magnet Generator (PMG)
Phase Rotation	A (U), B (V), C (W)
Alternator Cooling	Direct drive centrifugal blower
AC Waveform Total Harmonic Distortion	<5% total no load to full linear load <3% for any single harmonic
Telephone Influence Factor (TIF)	<50 per NEMA MG1-22.43
Telephone Harmonic Factor (THF)	<3



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Natural Gas												
Three Phase Table ¹		105° C	105° C	105° C	125° C	125° C	125° C	150° C	150° C	150° C		
Feature Code		B418	B415	B304	B417	B414	B303	B416	B413	B419		
Alternator Data Sheet Number		210	210	209	210	210	209	210	209	208		
Voltage Ranges		110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	347/600	110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	347/600	110/190 Thru 120/208 220/380 Thru 240/416	120/208 Thru 139/240 240/416 Thru 277/480	347/600		
Surge kW		160	160	160	160	160	160	160	159	159		
Motor Starting kVA (at 90% sustained voltage)	Shunt	563	563	516	563	563	516	563	516	422		
	PMG	663	663	607	663	663	607	663	607	497		
Full Load Current - Amps at Standby Rating		$\frac{120/208}{434}$	$\frac{127/220}{410}$	$\frac{139/240}{376}$	$\frac{220/380}{237}$	$\frac{240/416}{217}$	$\frac{277/480}{188}$	$\frac{347/600}{150}$				

Natural Gas												
Single Phase Table		105° C	105° C	125° C	125° C	125° C						
Feature Code		B418	B415	B417	B414	B273						
Alternator Data Sheet Number		210	210	210	210	210						
Voltage Ranges		120/240 ¹	120/240 ¹	120/240 ¹	120/240 ¹	120/240 ²						
Surge kW		157	157	157	157	160						
Motor Starting kVA (at 90% sustained voltage)	Shunt	330	330	330	330	330						
	PMG	385	385	385	385	385						
Full Load Current - Amps at Standby Rating		$\frac{120/240^1}{347}$	$\frac{120/240^2}{521}$									

Notes:


1. The broad range alternators can supply single phase output up to 2/3 set rated 3-phase kW at 1.0 power factor.
2. The extended stack (full single phase output) and 4 lead alternators can supply single phase output up to full set rated 3-phase kW at 1.0 power factor.




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Control System

 <p>8.1 L GENSET</p>	<p>Basic Control System</p> <ul style="list-style-type: none"> • Auto/Off/Run Control Switch • Transfer Switch Compatible (2 wire start) • Digital Engine Speed Control for fixed isochronous frequency regulation • Engine protection, including overspeed shutdown, overcrank shutdown, high engine alarm and shutdown, and low oil pressure alarm and shutdown. Fault flashout for indication of fault conditions (from engine module). • Newage SA465 AVR.
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Optional Control System

	<p>PowerCommand (2100) Control with AmpSentry™ Protection</p> <ul style="list-style-type: none"> • Integrated generator set control system providing voltage regulation, backup engine protection, and operator interface functions. • Fault flashout for indication of fault conditions (from engine module) • Inherent AmpSentry protection. AmpSentry provides a full range of alternator protection functions that are matched to the alternator provided. • NEMA 3R enclosure. • Suitable for operation in ambient temperatures from -40C to +70C, and altitudes to 13,000 feet (5000 meters). • Prototype tested; UL, CSA, and CE compliant. 	
<p>AmpSentry AC Protection</p> <ul style="list-style-type: none"> • Overcurrent and short circuit shutdown • Overcurrent warning • Single & 3-phase fault regulation • Over and under voltage shutdown • Over and under frequency shutdown • Overload warning with alarm contact • Reverse power and reverse Var shutdown • Excitation fault 	<p>Engine Protection</p> <ul style="list-style-type: none"> • Overspeed shutdown • Low oil pressure warning and shutdown • High coolant temperature warning and shutdown • Low coolant level warning or shutdown • Low coolant temperature warning • High and low battery voltage warning • Weak battery warning • Fail to start (overcrank) shutdown • Fail to crank shutdown • Redundant start disconnect • Sensor failure indication • Fixed speed control 	<p>Operator Interface</p> <ul style="list-style-type: none"> • OFF/MANUAL/AUTO mode switch • MANUAL RUN/STOP switch • Panel lamp test switch • Emergency Stop switch • Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls, and adjustments including voltage adjustment • LED lamps indicating genset running, not in auto, common warning, common shutdown (5) configurable LED lamps • LED Bargraph AC data display (optional)
<p>Alternator Data</p> <ul style="list-style-type: none"> • Line-to-line and line-to-neutral AC volts • 3-phase AC current • Frequency • Total and individual phase kW and kVA 	<p>Engine Data</p> <ul style="list-style-type: none"> • DC voltage • Lube oil pressure • Coolant temperature 	<p>Other Data</p> <ul style="list-style-type: none"> • Genset model data • Start attempts, starts, running hours • KW hours (total and since reset) • Fault history • Load profile • System data display (optional)
<p>Governing</p> <ul style="list-style-type: none"> • Digital Engine Speed Control for fixed isochronous frequency regulation 	<p>Voltage Regulation</p> <ul style="list-style-type: none"> • Integrated digital electronic voltage regulator • 3-phase line to neutral sensing • PMG (Optional) • Single and three phase fault regulation • Configurable torque matching 	<p>Control Functions</p> <ul style="list-style-type: none"> • Data logging on faults • Fault simulation (requires InPower) • Time delay start and cooldown • Cycle cranking • (3) Configurable customer inputs • (4) Configurable customer outputs • (8) Configurable network inputs and (16) outputs (with optional network)
<p>Options</p>		
<ul style="list-style-type: none"> <input type="checkbox"/> Power Transfer Control <input type="checkbox"/> Analog AC Meter Display <input type="checkbox"/> Thermostatically Controlled Space Heater 	<ul style="list-style-type: none"> <input type="checkbox"/> Key-type mode switch <input type="checkbox"/> Ground fault module <input type="checkbox"/> Engine oil temperature <input type="checkbox"/> Auxiliary Relays (3) 	<ul style="list-style-type: none"> <input type="checkbox"/> Echelon LonWorks interface <input type="checkbox"/> Digital input and output module(s) (loose) <input type="checkbox"/> Remote annunciator (loose)

Generator Set Options

Engine

- 120 V, 1500 W coolant heater
- 240V, 1500 W coolant heater

Alternator

- 105°C rise alternator
- 125°C rise alternator
- 120/240 V, 100 W alternator anti-condensation heater
- 12-lead broad range extended stack (full single phase output)
- Single phase (4-lead)

Exhaust System

- Mounted residential grade silencer (unhoused)
- Exhaust flex (muffler to customer connection)

Enclosures

- Weather-protective enclosure with silencer
- Quiet Site Level 1 enclosure with silencer
- Quiet Site Level 2 enclosure with silencer

Generator Set

- PowerCommand (2100) control
- AC entrance box
- Battery
- Battery charger
- Export box packaging
- Main line circuit breakers
- Remote annunciator panel
- Spring isolators
- 2 year standby warranty
- 5 year basic power warranty

Accessories and Services

A wide range of products and services is available to match your power generation system requirements. Cummins Power Generation products and services include:

- Diesel and Spark-Ignited Generator Sets
- Transfer Switches
- Bypass Switches
- Parallel Load Transfer Equipment
- Digital Paralleling Switchgear
- PowerCommand Network and Software
- Distributor Application Support
- Planned Maintenance Agreements



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Warranty

All components and subsystems are covered by an express limited one-year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available. Contact your distributor/dealer for more information.

Certifications



ISO9001 - This generator set was designed and manufactured in facilities certified to ISO9001.



PTS - The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Products bearing the PTS symbol have been subjected to demanding tests in accordance to NFPA 110 to verify the design integrity and performance under both normal and abnormal operating conditions including short circuit, endurance, temperature rise, torsional vibration, and transient response, including full load pickup.



UL - The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage.

See your distributor for more information



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Important: Backfeed to a utility system can cause electrocution and/or property damage. Do not connect generator sets to any building electrical system except through an approved device or after building main switch is open.